

WE CLAIM:

1. A method comprising:
a computer system generating first and second write transactions;
wherein the first and second write transactions comprise first and second tags,
respectively, wherein each of the first and second tags relate the first write
transaction to the second write transaction;
the computer system transmitting the first and second write transactions to first and
second storage devices, respectively.
2. The method of claim 1 further comprising:
the computer system generating third and fourth write transactions;
wherein the third and fourth write transactions comprise third and fourth tags,
respectively, wherein each of the third and fourth tags relate the third write
transaction to the fourth write transaction;
the computer system transmitting the third and fourth write transactions to the first
and second storage devices, respectively.
3. The method of claim 1 wherein:
the first write transaction comprises data D to be written to a logical block of a first
storage object;
the second write transaction comprises data D to be written to a logical block of a
second storage object.
4. The method of claim 3 further comprising:
the first storage device receiving the first write transaction;
the first storage device storing in an entry of a first tag table, the first tag and an
identity of the logical block where data D is to be written, wherein the first tag
table is stored in first memory;
the second storage device receiving the second write transaction;
the second storage device storing in an entry of a second tag table, the second tag and
an identity of the logical block where data D is to be written, wherein the
second tag table is stored in second memory.

5. The method of claim 1 wherein:

the first write transaction comprises data D to be written to a range of logical blocks of a first storage object;

the second write transaction comprises data D to be written to a range of logical blocks of a second storage object.

6. The method of claim 5 further comprising:

the first object storage device receiving the first write transaction;

the first storage device storing in an entry of a first tag table, the first tag, an identity of the first storage object, and an identity of the range of logical blocks of the first storage object where data D is to be written, wherein the first tag table is stored in first memory;

the second object storage device receiving the second write transaction;

the second storage device storing in an entry of a second tag table, the second tag, an identity of the second storage object, and an identity of the range of logical blocks in the second storage object where data D is to be written, wherein the second tag table is stored in second memory.

7. The method of claim 4 further comprising comparing the contents of one entry in the first tag table with the contents of entries in the second tag table to determine whether the second tag table includes an entry that matches the one entry.

8. The method of claim 7 further comprising copying data, associated with the logical block number identified by the one entry, from the first storage object to the logical block in the second storage object if the second table lacks an entry with contents matching the contents of the one entry

9. The method of claim 7 further comprising deleting the one entry in the first table if the second table contains an entry with contents that match the contents of the one entry.

10. The method of claim 9 further comprising deleting the entry in the second table with contents that match the contents of the one entry.

11. The method of claim 1 further comprising:

the computer system generating a write transaction to write data to a logical block of a data volume;

the computer system incrementing a counter in response to generating the write transaction;

the computer system generating the first and second tags, wherein each of the first and second tags relate to the first and second write transactions, respectively, wherein the first and second tags are generated in response to generation of the write transaction, and wherein the first and second tags are generated as a function of an output of the incremented counter.

12. The method of claim 1 wherein the first and second storage devices comprise first and second object storage devices.

13. The method of claim 1 wherein:

the first write transaction comprises data D to be written to an extension of a first storage object;

the second write transaction comprises data D to be written to an extension of a second storage object.

14. The method of claim 13 further comprising:

the first object storage device receiving the first write transaction;

the first storage device storing in an entry of a first tag table, the first tag, an identity of the first storage object, and an indication that data D is to be stored in the extension of the first storage object, wherein the first tag table is stored in first memory;

the second object storage device receiving the second write transaction;

the second storage device storing in an entry of a second tag table, the second tag, an identity of the second storage object, and an indication that data D is to be stored in the extension of the second storage object, wherein the second tag table is stored in second memory.

15. A method comprising:
a computer system generating a write transaction, wherein the write transaction comprises data to be written to a storage object and a tag unique to the write transaction;

the computer system transmitting the transaction to a storage device.

16. The method of claim 1:
wherein the computer system generates the first and second write transactions in response to generation of a write transaction by a first application executing on the computer system, wherein the first and second tags are generated by a first tag generator;

a second computer system generating third and fourth transactions in response to generation of a write transaction by a second application executing on the second computer system;

wherein the third and fourth write transactions comprise third and fourth tags, respectively, wherein each of the third and fourth tags relate the third write transaction to the fourth write transaction, wherein the third and fourth tags are generated by a second tag generator.

17. A computer readable medium storing instructions executable by a computer system, wherein the computer system implements a method in response to executing the instructions, the method comprising:

generating first and second write transactions;

wherein the first and second write transactions comprise first and second tags, respectively, wherein each of the first and second tags relate the first write transaction to the second write transaction;

transmitting the first and second write transactions directly or indirectly to first and second storage devices, respectively.

18. The computer readable medium of claim 17 wherein the method further comprises:

generating third and fourth write transactions;
wherein the third and fourth write transactions comprise third and fourth tags,
respectively, wherein each of the third and fourth tags relate the third write transaction to the fourth write transaction;
transmitting the third and fourth write transactions directly or indirectly to the first and second storage devices, respectively.

19. The computer readable medium of claim 17 wherein:
the first write transaction comprises data D to be written to a logical block of a first storage object;
the second write transaction comprises data D to be written to a logical block of a second storage object.

20. The computer readable medium of claim 17 wherein:
the first write transaction comprises data D to be written to a range of logical blocks of a first storage object;
the second write transaction comprises data D to be written to a range of logical blocks of a second storage object.

21. The computer readable medium of claim 17 wherein the first tag is identical to the second tag.

22. The computer readable medium of claim 17 wherein the method further comprises:

generating a write transaction to write data to a logical block of a data volume;
incrementing a counter in response to generating the write transaction;
generating the first and second tags, wherein each of the first and second tags relate to the first and second write transactions, respectively, wherein the first and second tags are generated in response to generation of the write transaction, and wherein the first and second tags are generated as a function of an output of the incremented counter.

23. The computer readable medium of claim 17 the first and second storage devices comprise first and second object storage devices.

24. The computer readable medium of claim 17:
the first write transaction comprises data D to be written to an extension of a first storage object;
the second write transaction comprises data D to be written to an extension of a second storage object.

25. A computer readable medium storing instructions executable by a computer system, wherein the computer system implements a method in response to executing the instructions, the method comprising:

generating a write transaction, wherein the write transaction comprises data to be written to a storage object and a tag unique to the write transaction;
transmitting the transaction to a storage device.

26. A computer readable medium storing instructions executable by a computer system, wherein the computer system implements a method in response to executing the instructions, the method comprising:

in response to receiving a first transaction comprising a first tag, storing in an entry of a first tag table, the first tag and an identity of the logical block where data D is to be written, wherein the first tag table is stored in first memory, wherein the first tag corresponds to a second tag of a second write transaction;
the second storage device receiving the second write transaction;
the second storage device storing in an entry of a second tag table, the second tag and an identity of the logical block where data D is to be written, wherein the second tag table is stored in second memory.